1991-92

ANNUAL REPORT

Alberta

TECHNOLOGY, RESEARCH
AND TELECOMMUNICATIONS

ALBERTA
ECONOMIC DEVELOPMENT
AND TOURISM

Office of the Minister

May, 1993

The Honourable Dr. David J. Carter
Speaker of the Legislative
Assembly of Alberta
325 Legislature Building
Edmonton, Alberta
T5K 2B6

Dear Sir:

I have the honour to submit the Annual Report for the Department of Technology, Research and Telecommunications for the year ending March 31, 1992.

Respectfully submitted,

Don Sparrow

Don Sparrow
MINISTER

TOWARD 2000 TOGETHER

In conjunction with Tourism 2000 and Special Places 2000

424 Legislature Building, Edmonton, Alberta, Canada T5K 2B6 Telephone 403/427-3162 Fax 403/422-6338

Alberta
ECONOMIC DEVELOPMENT
AND TOURISM

Office of the
Deputy Minister

May, 1993

The Honourable Don Sparrow
Minister of Economic Development
and Tourism
424 Legislative Building
Edmonton, Alberta
T5K 2B6

Dear Mr. Sparrow:

I have the honour to submit the Annual Report for the Department of Technology, Research and Telecommunications for the year ending March 31, 1992.

Yours sincerely,

Al N. Craig
Deputy Minister

OVERVIEW

Technology development has assumed economic importance in two distinct, but mutually reinforcing, senses. First, the application of advanced technologies is clearly acknowledged as a means of enhancing productivity within traditional industrial sectors. Secondly, advanced technologies offer unique potential as the basis on which entirely new industries can be developed. Viewed from this perspective, technology development can be seen as serving two fundamental economic objectives. As a means of enhancing productivity within existing industries, it serves the objective of economic growth; as the basis for the development of new industries, it serves the objective of economic diversification.

The influence of advanced technologies is absolutely pervasive. The development and application of advanced technologies affects every sector of the economy: agriculture, mining, manufacturing, even finance and retail trade. Emerging technologies are shaping workforce demands and, by association, education and training programs. The influence of advanced technologies is also becoming apparent in the public policy agenda, notably in areas such as health care and the environment. Moreover, this pervasive influence is by no means unique to Alberta; technology development is truly an international phenomenon and, as such, is affecting trade patterns, foreign exchange rates and the competitive advantage of nations.

MISSION STATEMENT

Since its inception in 1986, the primary focus of Technology, Research and Telecommunications (TR&T) was to exploit the economic diversification and growth potential associated with advanced technologies. This focus is reflected in two distinct thrusts which constituted the Department's mission statement. More specifically, the Department's mission was to contribute to the growth and diversification of the Alberta economy by:

- supporting the creation and expansion of technology-intensive industrial clusters, notably in the fields of: advanced materials, biotechnology, telecommunications, electronics, environmental technologies, information technologies and medical devices; and
- encouraging the application of advanced technologies in traditional resource industries and manufacturing.

Success in fulfilling this mission would be indicated by an increase in the number of technology-intensive companies in the province; an increase in the size of such companies in terms of revenue, employment, investment, exports, etc.; an increase in the aggregate size of these companies relative to the economy as a whole; and an increase in the use of state-of-the-art technologies in traditional economic sectors.

DEPARTMENT GOALS

While the Department's mission was described in terms of "industrial clusters" and "industries", Technology, Research and Telecommunications embraced four broad goals which are widely acknowledged as being critical to any modern technology development strategy. Reflecting the same tenor as the National Science and Technology Action Plan, these goals were:

- to support company formation and development;
- to build technology infrastructure within the province;
- to support human resource development;
- to build a general public awareness of the importance of technology development.

DEPARTMENT POLICIES

The policies of Technology, Research and Telecommunications traditionally concentrated financial support on selected segments of the "innovation spectrum." This concept suggests that the development of technology-intensive products or processes is a cumulative process built upon basic research, applied research and development, the transfer of research results to commercial enterprises, product development and, ultimately, commercialization. Consequently, the Department's policies were designed to provide support for:

- basic research aimed at advancing the body of scientific knowledge which serves as the foundation for virtually all technology-intensive products and services;
- applied research and development aimed at converting knowledge into new or improved processes. This is frequently accomplished by marrying universities' knowledge base with the commercial motives of industry in a research centre;
- transfer of knowledge into the hands of entrepreneurs and industry, be it from universities, public research institutions, or foreign sources;
- specialty state-of-the-art facilities which are relevant to local industry, but which lie beyond the financial means of any individual firm;
- development, expansion or establishment of companies which constitute Alberta's technology-intensive industrial cluster. For the purposes of appropriate treatment, these can be segregated into three categories:
    (a) emerging companies - indigenous Alberta enterprises needing assistance to bring first products to market;
    (b) threshold companies - those facing the proposition of having to "bet their existence" on expanding proven technology capabilities to second generation products and global competition;
    (c) strategically significant companies - typically large transnationals whose presence in Alberta would have a major positive impact vis-a-vis local suppliers, research competence and identified spin-off benefits;
- corporate venturing and forging linkages between universities, industry and government which are necessary for optimal economic progress (i.e. pre-competitive joint research ventures, co-operative projects among the western provinces);
- technology adaptation aimed at increasing the utilization of advanced technologies in traditional industries and areas that are of emerging public significance (e.g. the environment).

BUSINESS DEVELOPMENT AND MARKETING

The Department identified a number of advanced technology sectors in which Alberta may be competitive on a worldwide basis. These are:

- electronics\microelectronics;
- information technologies;
- telecommunications;
- medical and biological sciences;
- advanced materials and processes; and
- advanced manufacturing technologies.

The Business Development and Marketing division was responsible for promoting these areas and assisting Alberta companies to develop new and innovative products which have local and international market potential.

The division administered a $1.2 million Technology Commercialization Program which provided financial assistance to private sector requests for institute support, new product development, research commercialization and feasibility studies.

Electronics/Microelectronics

The Electronics/Microelectronics section was responsible for assisting Alberta industry with incorporating and developing new electronic and microelectronic products. The industry is well supported by Alberta's advanced technology infrastructure, which includes "building block" facilities such as the Electronics Test Centre, the Alberta Microelectronic Centre (AMC) and The LASER Institute.

Electronics/Microelectronics has been involved with co-ordinating projects between the AMC, industry and the federal Department of Communications. To this end, joint projects have been proposed under the Western Economic Partnership Agreement in Communications Technology.

During the past year, efforts focused on promoting increased participation by Alberta's companies and institutes in strategic alliances. This led to the attraction of two new companies to Alberta, as well as to several joint ventures. The section also participated in several missions with Alberta companies which led to increased sales and exports. These efforts have been aided by the development of a new electronics manufacturers database, which has assisted in the identification of new business opportunities.

This year saw the successful transfer of a fibre optic technology project from Telecommunications Research Laboratories (TRLabs) to the private sector. Electronics/Microelectronics was responsible for initiating the process, which saw the creation of a new company that now employs seven people and is actively engaged in marketing to the oil and gas industry.

Telecommunications

Telecommunications is the fastest growing sector and the industry is a strategically important area for economic growth and diversification. Alberta has a mature telecommunications infrastructure and an internationally recognized industry that operates at the forefront of technology.

The Telecommunications section was responsible for attracting new companies which provide telecommunications services and products, and for the promotion of strategic alliances with new and existing companies. The section constantly reinforced Alberta's commitment to existing companies.

Initiatives in the past year concentrated on fulfilling these responsibilities, as well as assisting in obtaining additional government, industrial and educational sponsors for the Telecommunications Research Laboratories (TRLabs).

The section co-operated with Communications Canada (DOC), External Affairs and International Trade Canada (EAITC), Industry, Science and Technology Canada (ISTC) and Investment Canada at the federal level, and Alberta Economic Development and Trade (ED&T) at the provincial level to encourage the development of strategic alliances between Alberta-based telecommunications companies and foreign companies, mainly located in the Far East.

In October 1991, the Telecommunications section represented the Government of Alberta at the International Telecommunications Union (ITU) 6th quadrennial World Telecommunications Exhibition and Forum in Geneva.

Biotechnology and Medical Sciences

Alberta's biomedical research and development infrastructure is among the best supported of any equivalent jurisdiction in North America. Research funded by the Alberta Heritage Foundation for Medical Research (AHFMR) has resulted in significant discoveries in the world of medicine and health care. The section assisted with the commercial processes for these and other technology developments in the private sector.

A working relationship was maintained with the AHFMR Medical Innovations Program which supports prototype development, market research, development of production methods, start-up manufacturing and clinical trials.

The section also assisted product and process development using biotechnology in agriculture, environment, energy and forestry, and consulted on policies and regulations pertaining to sector issues.

The section liaised with university medical and pharmaceutical faculties in Alberta, and with provincial and federal industry associations.

Medical Devices

The Medical Devices section was responsible for helping Alberta's medical device industry develop and commercialize new health care products used for diagnostic or therapeutic purposes. These include products and equipment specifically designed for hospitals, nursing homes and home health care applications.

The section liaised with medical associations such as Medical Devices Canada (MEDEC), Health Opportunities Metro Edmonton (HOME) and Alberta Healthcare Association (AHA). It co-operated with the Alberta Heritage Foundation for Medical Research (AHFMR), the Bio-Medical Engineering Centre and other provincial and federal organizations to help Alberta's medical devices industry grow.

Initiatives of the past year included:

- In co-operation with Industry, Science and Technology Canada (ISTC), developed terms of reference that aided in preparing an Overview and Development Plan for the Medical Devices Industry of Alberta.
- Managed recruiting and arranged financing through Western Economic Diversification (WED) for Alberta medical devices companies which successfully participated at the International Innovative Medical Technology Show in London, Ontario.
- Organized a round table seminar/discussion with the participation of industry, university, hospitals, ARC, AHFMR and ISTC on the formation of a technology institute for medical devices made in Alberta.
- As a member in the Health Opportunities Metro Edmonton (HOME) program committee, the section assisted in the development of an industry network in Edmonton.

Information Technologies

The Information Technologies section was responsible for helping Alberta's information technologies industry to develop and commercialize new products. Developments of importance include high performance computers, engineering workstations and related applications software (often involving artificial intelligence), expert systems, computer-aided design, drafting, engineering and multi-media presentations.

Information Technologies also co-operated with the computing sector association including the Software Alberta Society; Canadian Information Processing Society; the Edmonton and Calgary Advanced Technology Associations; Alberta Chapter of Canadian Advanced Technology Association; Information Technology Association of Canada; and the Alberta Courseware Producers Association.

Other activities of the section included;

- Printing and distribution of the Software Products and Capabilities Directory;
- Participating in the intergovernmental Software Industry Liaison Committee dealing with Software Products Sector Campaign;
- Assisting with development and approval of Land Related Information Systems; and
- Assisting with initiatives for increasing National Research Council's (NRC) Information Technology presence in Alberta and with the Calgary-based Info-port initiative.

Information Technologies

This section also focuses on interactive technologies. In co-operation with industry and communications Canada, three initiatives were established: SPIRIT (Support and Promotion Initiative for Research in Technology), CISA (Courseware Industry Support Agency) and the Courseware/Petroleum Industry initiative. These projects will be put forward for joint industry-government funding through the Alberta-Canada Partnership Agreement.

In March 1992, the section organized a mission to Hanover, Germany, to meet with European companies and to participate in the world's largest information technology trade show, CeBIT. This was the first time Alberta participated directly in CeBIT. It was also the first time Alberta shared booth space under the Northwest Pacific Consortium banner.

In addition, the section assisted in proposing initiatives to illustrate the electronic highway concept presented at the Western Premiers Conference, including the broadcasting of live interactive programs from dinosaur excavation sites. The section also facilitated the transmission of a live broadcast program, Canadian Underwater Safari, from Race Rocks, British Columbia, to Alberta.

As part of its ongoing responsibilities, the section continued to provide advice to companies, assess proposals (business plans) and monitor funded projects. As well, the section recruited companies for trade shows and missions conducted by other federal and provincial departments.

Advanced Materials and Processes

Advanced materials and advanced methods of processing materials into useable products form an important group of strategic enabling technologies which underpin the performance of all other industries, traditional and emerging.

Industrialized nations such as Japan, the United States, Germany, France, the United Kingdom and Canada have acknowledged the paramount importance of Advanced Industrial Materials (A.I.M.) and, as a consequence, are taking special steps to develop this industry sector.

In Alberta, new or advanced materials and processes are developed by means of applied industrial research. This research is directed towards reducing the cost of operation in existing competitive markets such as oil and gas production, forestry, agriculture, petrochemicals, mining and mineral production.

The development of new processes and materials, when applied to strength industries in the province, is a major contributor to productivity improvement. Diversification of the Alberta economy is being achieved in new areas of economic activity such as electronics, telecommunications and biotechnology. Advanced materials and processes are playing a vital role in making this diversification possible.

Alberta's advanced materials and processes industry sector includes companies which manufacture fine ceramics (structural and functional), specialty metals, advanced polymers and new types of materials composites. Also included are companies which use advanced manufacturing techniques to produce technically superior components and finished products. These components and products possess exceptional mechanical, physical or chemical properties and sell at premium prices due to their unique characteristics. Other companies own the patents or licenses to particular materials technology which give them a competitive advantage.

The $140 million Westaim initiative, with industrial leadership from Sherritt Gordon Ltd. and financial support from the Alberta and federal governments, is providing a major step forward for the advanced materials industry in Canada. An extensive market-driven applied research program is underway at the project's Mackiw Materials Centre located at Fort Saskatchewan. The jointly funded project promises to provide new industrial development with allied companies, benefits for Alberta's advanced materials research community and new materials for Sherritt Gordon's product diversification. In 1991-92, the project was in the third year of a five-year agreement.

Manufacturing Technologies

The Alberta Manufacturing Network (AMN) started to serve Alberta's manufacturing community in 1991. AMN is one component of Industry Alberta Inc. (IAI), a larger economic concept intended to co-ordinate the activities of all Alberta's wealth generators. Both are ad-hoc groups which are establishing legal identities and developing business plans.

Both AMN and IAI are partnerships of business, labour and Government; both focus on the same five competitiveness factors:

- Marketing: studying market research and distribution, licensing of Market Scout; creating a rapid prototype system; introducing concurrent engineering, intelligent manufacturing systems and industrial design
- Technology development: building research centre support, encouraging a technology transfer mechanism, introducing a manufacturing diagnostic service, distributing information, establishing new technology centres
- Human resource development: creating the Alberta Manufacturing Education Council, continuing manufacturing conferences, helping guide The University of Calgary's Manufacturing Engineering proposal and junior high science and technology career study program, supporting technical societies
- Finance: creating a joint venture to analyze existing federal and provincial government manufacturing support
- Alliances: creating a Memorandum of Understanding between the Canadian Manufacturers Association, Consulting Engineers of Alberta and Alberta Research Council; creating regional advisory councils in Medicine Hat, Lethbridge and Red Deer. Grande Prairie already has the Peace Country Innovation Centre.

TECHNOLOGY TRANSFER

The Technology Transfer section focused on the commercialization of inventions and new technology generated by the universities, institutes and private sector in Alberta. The section maintained close ties with the technology transfer offices at the University of Alberta; University Technologies International (UTI), Calgary; and the Northern Alberta Institute of Technology (NAIT).

Financial support provided to these technology transfer offices helped with licenses and patents of new technologies. In the medical field, a number of patents were sought in areas as diverse as non-desensitizing analogues, non-invasive imaging systems and a swine vaccine. Assistance to the technology transfer offices also led to spin-off companies like L&R Wang Enterprises Ltd. (the Coldbuster Bar) and Ova-biotechnica Inc. (Dr. Sim's Designer Eggs).

Technology Transfer managed the First Purchase Program, which provides assistance to companies marketing a new product. Through the program, companies were put in contact with a Provincial department or agency that would benefit from their product.

The International Technology Transfer Program provided assistance to companies or researchers pursuing technology transfer with partners in another
country. Some countries involved include: Belgium, Germany, Hungary, Finland, Russia and the Netherlands.

Through this program, projects were explored in the areas of hazardous waste management, environmental impact on infrastructure and oil shale ash clean-up.

An exchange program called the Finnish/Alberta Opportunity Interchange was established between Technology, Research and Telecommunications and the Finnish Technology Development Centre (TEKES). A Finnish government agency, TEKES is responsible for R&D funding, co-ordination of national and international technology programs, technology transfer and diffusion.

Alberta participated in the Flanders International Technology Exhibition in 1991, which provided an opportunity for Alberta researchers to make important contacts in Flanders. As a follow-up to the Memorandum of Understanding with Flanders, a work program was developed and five joint projects were approved.

A Department mission to Finland, Germany and Hungary took place in September of 1991 and led to a number of positive initiatives. These include an ongoing relationship with the Partnerlink Program led by the Finnish Ministry of Trade and Industry, joint R&D projects between Alberta Research Council (ARC) and the Technical Research Centre in Finland, and industry partnerships between the Hungarian Ministry of Agriculture and Alberta industry partners.

In conjunction with the Licensing Executive Society, Technology Transfer sponsored technology transfer seminars in Edmonton and Calgary.

Technology Transfer took an active role in administering the Alberta/Heilongiiang Science and Technology Exchange program. Steps are being taken in co-operation with the Alberta Research Council to change this program from a strong research orientation to supporting projects with commercial potential. The intent is to broaden the geographic scope to include potential partners in other provinces in China as well as other Asian countries.

INVESTMENT DEVELOPMENT

The prime objective of the Investment Development and Promotion section was to promote investment in Alberta's advanced technology sectors.

The section developed and reinforced an awareness in the Canadian and international business communities of the Alberta Government's commitment to research, development and commercialization of advanced technologies. It encouraged investment in advanced technology development by promoting Alberta's programs, facilities and institutions.

The section started the year with participation in the Flanders Technology International Exhibition in Ghent, Belgium, along with 13 Alberta companies and institutes. A first-time visit was made to Texas for the American Society for Microbiology Exhibition as part of the Canadian pavilion. Other exhibitions included the Canadian High Technology Show in Toronto and CeBIT '92 in Hanover, Germany. In support of Alberta professional and scientific organizations, the branch participated in several exhibitions in Edmonton and Calgary to promote public awareness of Alberta's advanced technology capabilities and accomplishments.

In return, international delegations from Belgium, Hungary, Netherlands, Japan and Finland visited the province and were introduced to Alberta's advanced technology infrastructure.

Through efforts of the section, a presentation was given to the Churchill Club in San Mateo, California, by several Alberta companies whose parent organizations are located in California. The benefits of opening branch offices in Alberta were also discussed. A ministerial presentation and luncheon were organized for the Canadian Manufacturers' Association in Toronto.

RESEARCH, POLICY AND PLANNING

The Research, Policy and Planning division provided research, advice and co-ordination in the development and administration of Alberta Government policy in telecommunications, research and development, the broadcasting and cable television sectors, and science and technology.

The division was responsible for long-term planning within the Department and assisted in the development of specific plans for advanced technology sectors. It also provided technical, economic, financial and policy advice to support departmental programs and other initiatives.

In addition, the Research, Policy and Planning division provided support to the Minister in his responsibilities for the administration of the Alberta Research Council Act, Alberta Heritage Foundation for Medical Research Act, Alberta Educational Communications Corporation Act, the Telecommunications Act, the Alberta Government Telephones Reorganization Act and the Alberta Foundation for Nursing Research Order.

The division had administrative responsibility for the delivery of several programs, including the Alberta-Heilongjiang Science and Technology Exchange Program, the Conference Grant Program and the Individual Line Service Program.

Telecommunications Policy

With AGT Limited formally under the regulatory jurisdiction of the federal Canadian Radio-Television and Telecommunications Commission (CRTC), the division was involved in numerous regulatory proceedings involving AGT Limited's activities in the province, as well as with other industry developments of importance.

In April 1991, the CRTC commenced its landmark public hearing into applications by Unitel Communications Ltd. and BC Rail/Lightel Telecommunications Inc. to provide competitive long distance voice service in Canada.

The Department was a registered intervenor in the proceedings and filed interrogatories and a final argument outlining the Province's concerns and position. While it was in favour of public long distance voice service, the introduction must not compromise the availability, affordability and quality of existing telecommunications service.

The Department was also a registered intervenor and actively particpated in the AGT Limited application for local rate increases. The Department's concern was to balance the need for just and reasonable rates and service quality with AGT Limited's need to make an equitable profit.

The Department made other representations to the CRTC on the regulatory status of telecommunications service resellers under federal legislation; the extension of federal resale rules to AGT Limited; and interconnection issues involving AGT Limited, ED TEL and various federally regulated carriers.

The Department co-sponsored a study with the federal Department of Communications and the governments of Manitoba and Saskatchewan. The study examined some of the issues associated with the transition of provincial telecommunications carriers to CRTC regulation.

The study will identify suitable forms of economic regulation for the prairie telephone companies within their respective operating environments and ownership structures, while recognizing their various policy, technological and market demands. The final report will be completed in fiscal 1992-93.

The division continued to liaise with federal departments on other matters affecting telecommunications service in Alberta. Topics included:

- Establishment of a national high-speed data network;
- Database and courseware development initiatives;
- Regulatory issues;
- Local microwave communications licensing;
- Proposed federal telecommunications legislation (which received first reading in February 1992); and
- The policy implications of the converging telecommunications and cable television carriage technologies.

The division also liaised with AGT Limited and ED TEL in matters involving the Province and relations between the two companies.

The Department was involved in numerous interdepartmental efforts such as following up on the Minister's Committee on Local Development, sponsoring a feasibility study on establishing a province-wide E-911 emergency calling system, and providing input into the drafting of proposed provincial municipal government legislation and the constitutional negotiation process.

The division was also heavily involved in developing departmental policies on information technologies issues and their incorporation in provincial economic development initiatives like the Toward 2000 Together process.

Broadcasting and Cable Policy

The division was involved in numerous broadcasting and cable television proceedings before the CRTC, including a public hearing in Edmonton regarding unlicensed religious broadcasters.

The division worked with ACCESS Network on an array of issues affecting its activities. The Department was involved in the CRTC public hearings into ACCESS Network's application to allow paid advertising on its network.

The division liaised with private broadcasters on the establishment of new broadcasting enterprises in the province, and with cable television operators on their concerns over property tax related issues and the impact of proposed provincial legislation. Due to the broadcasting industry's close relationship with television and film production, the division was also called upon to provide analysis and comments to the Minister on the federal Balcon Report on the Motion Picture Industry in Alberta. Given the increasing potential of computers and other information technologies, the division was also involved with industry and the federal Department of Communications in exploring the uses of these technologies in creative and multimedia applications.

Canada/Alberta Partnership Agreement in Communications (Technology)

The division was actively involved in finalizing the Canada/Alberta Partnership Agreement in Communications (Technology), which was signed on March 17, 1992, by the Minister and his federal counterpart. The agreement, which will be administered by Economic Development and Tourism, calls for the federal and provincial governments to spend a total of $5 million each until the end of the 1994/95 fiscal year. The three funding elements of the agreement include $5 million towards the establishment of a wireless communications research centre in Calgary by TRLabs Inc., $2 million towards developing microelectronic products for telecommunications applications and $3 million towards the support for information technology development projects.

The agreement is one of the eight Western Economic Partnership Agreements (WEPA) negotiated by various provincial government departments and their federal counterparts in 1991.

Science and Technology Policy

The Department played an active role in the National Council of Science and Technology Ministers. Alberta has taken the lead in the area of technology transfer, promoting increased co-operation between provinces and enhancing international technology transfer capabilities.

The Forum for Western Ministers Responsible for Science and Technology actively promotes co-operation between the western provinces in science and technology. Co-operation among the western provinces exists in the areas of space technology, environment, software engineering, geographic information systems and the pharmaceutical industry.

The Alberta Government participated in the third annual National Forum of Science and Technology Advisory Councils held in British Columbia from September 29 to October 1, 1991. Workshops were held on the issues of finance, measurement, science education, public awareness of science and technology transfer.

Science and Technology Exchange Program - Alberta Heilongjiang

The Department, in conjunction with the Alberta Research Council, has supported 24 scientists from Heilongjiang since 1986 through this Exchange Program.

Along with their Alberta counterparts, the Chinese scientists were involved in a number of research activities during the year. These included:

- gene technology and lipid manipulation;
- low temperature properties of asphalt concrete;
- super absorbent polymers;
- geographic information.

Trilateral consultations continue between the sister provinces of Alberta, Heilongjiang and Hokkaido (Japan). Efforts are being made to co-ordinate research in the areas of wheat amelioration, aquaculture and building materials.

Space-Related Projects

The Department co-operated with three other western provincial governments, the federal government and four leading western space companies to support the Earth Environment Space Initiative (EESI). EESI is a long-term space program for Canada with a twofold purpose: to provide new, valuable and affordable information for environmental monitoring and resource management, and to create an industrial infrastructure for expanded international market share and future EESI small satellite usage.

The first phase of the EESI project, the project definition study, was completed in June 1991. A detailed marketing study and cost/benefit analysis followed, which was completed in February 1992. The EESI team is presently developing plans to secure funding for the next phase of the project which involves specification, preliminary design and technology verification.

The Department worked closely with its western colleagues to ensure that the EESI project becomes an integral part of the Canadian Space Agency's long term space plan.

The Department continued its participation in Canada's RADARSAT project. RADARSAT is a Canadian-led international joint program to design, construct and operate Canada's first earth observation satellite system. Alberta is participating in policy development, planning and guidance on the domestic aspects of the program in matters relating to the acquisition, processing and distribution of the RADARSAT data. The satellite is currently under construction and will be ready for launching in 1994.

Individual Line Service Program

The Individual Line Service (ILS) Program began in September 1987 with the goal of replacing all party-lines in the province with individual line service. When the program was officially completed on June 30, 1991, approximately 115,500 rural subscribers throughout Alberta had received individual line service.

As ordered by the Alberta Public Utilities Board at the start of the program, customers had the option of making either a one-time payment to AGT Limited of $560, or equivalent monthly payments of $5. In keeping with the Government's earlier commitment to provide this service at $450, subscribers received a rebate of $110 from the ILS Rebate Program. This program also refunded monthly surcharges to the 26,000 rural customers who acquired private lines before the ILS Program began. The division was responsible for administering the ILS conversion as well as the Rebate Program.

Trade and Economic Development Initiatives

The division participated in a number of interdepartmental initiatives, studies and reports dealing with provincial economic diversification strategies, achievements and related issues. Most notable was the Toward 2000 Together process. In the area of trade, the division was involved in monitoring a number of international trade developments, including the Uruguay Round of GATT negotiations and its possible impact on advanced technology manufacturers and service providers in the province. Similar activity was also undertaken with respect to the North American Free Trade Agreement (NAFTA) negotiations, as well as with negotiations to address interprovincial trade barriers.

The division continued to assess the implementation of the Canada-U.S. Free Trade Agreement (FTA) and its impact on Alberta's advanced technology industries. The division was also involved in identifying ways in which industry could continue to maximize the benefits of the agreement.

Industry and Statistical Research

This division published information and responded to numerous inquiries from the public relating to composite indicators of technology-intensive enterprises, product array and R&D activities. With Statistics Canada, the Department co-sponsored the 1990-91 census of Provincial Government Scientific Activities. Time series data on investments in Alberta's R&D capabilities were provided to several public sector organizations and agencies.

Conference Grant Program

The Department started the Conference Grant Program in 1990-91. This program provided modest financial support to Alberta-based conferences and seminars that contributed to the development or improvement of research and technology.

The Conference Grant Program supported eight events in 1991-92. Program funds were instrumental in securing other public and private sector contributions.

The Technology and Research Advisory Committee (TRAC)

The Technology and Research Advisory Committee (TRAC) consists of representatives from Government departments involved in technology and research. In 1991-92 it reported to the Minister of Technology, Research and Telecommunications.

TRAC completed a major pan-department/agency overview of Government research programs. It analyzed the Alberta Government's involvement and the impact of research and development on the economic and social well being of the province.

TRAC also reviewed major provincial and national policy documents and reports, as well as research and development proposals. Reviewed proposals reviewed included the Coal Research and Development Strategy, the Alberta Centre for Upgrading Technology and the Agriculture Research Institute.

Networks of Centres of Excellence (NCE)

Technology, Research and Telecommunications contributed $2 million in 1991-92 as part of a $4 million provincial contribution to the federal Networks of Centres of Excellence (NCE) Program. Alberta participants are involved in 12 of the 15 networks funded by the $240 million program. Alberta will receive almost $20 million from the federal government over the four years. Alberta scientists and technicians will conduct research in medical technologies and advanced technologies. Alberta's successful efforts to build a research infrastructure meant provincial researchers were able to compete successfully in this national program.

FINANCIAL PROJECTS AND ADMINISTRATION

Financial Projects and Administration provided analytical support, project appraisal and advice to the Department and Minister on financial aspects of projects funded by Technology, Research and Telecommunications. The division liased with the Department of the Attorney General to co-ordinate legal and contract services to the Department. It was responsible for negotiating, drafting and processing financial agreements and contracts. It also provided administrative support, including Electronic Data Processing (EDP) services and financial advisory services, to the Department. The division established and maintained accounting records and procedures, and prepared the annual Department budget. It also monitored the Department's expenditures and contracts with the private sector.

HUMAN RESOURCES

The Human Resource division developed personnel systems and programs and provided consulting services to departmental managers and staff. These programs include recruitment and selection, classification and compensation, employee relations, organizational design, human resources planning, and pay and benefits administration. The division also managed human resources for the Premier's Council on Science and Technology. The division was instrumental in developing an Employee Recognition Program and implementing Total Quality Management (TQM) during 1991-92.

CORPORATE AND PUBLIC RELATIONS

Corporate and Public Relations managed the flow of information that supported the Department's mandate. It designed and delivered promotional materials required by other divisions of the Department and co-ordinated information dissemination.

Corporate and Public Relations also worked with the advanced technology community to help create greater public awareness and understanding of the challenges and achievements of the sector.

To help meet its goal of creating a science culture in Alberta, Corporate and Public Relations co-ordinated Alberta's Science and Technology Week and played a key role in the Alberta Science and Technology Leadership (ASTech) Awards.

Science City Fund

Corporate and Public Relations administered the Science City Fund, a grant fund which supported projects that stimulated an interest in and an understanding of the role and impact of science and technology. During this year, the fund supported 11 projects, the majority of which focused primarily on students. For some projects, Science City Fund support was integral in helping obtain funding from the federal government's Science Culture Canada Program.

SCIENCE AND TECHNOLOGY CAREERS

Interactive Technology for Education/Employment/ Career (ITEC)

Two of six interactive videodisc systems on the careers in science and technology (ITEC) project were developed to give students in Alberta an awareness of and motivation for career paths in advanced technology occupational sectors. With financial support from the Department and other organizations, the ITEC project was co-ordinated by the Centre for Career Development Innovation located at Edmonton's Concordia College.

The first videodiscs were successfully piloted around the province before release. *Dare to Dream* provides users with a survey of career paths in five high-tech sectors: Environment, Health, Computing, Telecommunications, and Materials and Processes. *Working Hard, Caring Heart* provides similar information on the Environment sector. Ten test sites throughout the province included five high schools, three career development centres, a youth employment sciences centre and a library. Over 25,000 users were identified during the six month test period.

Science Alberta Foundation

The Department, along with the Alberta Lottery Fund, was instrumental in providing financial support to establish the Science Alberta Foundation, a new science network proposed for the province. The foundation began a two-year pilot project aimed at fostering a greater awareness among all Albertans about science and technology and to encourage young Albertans to investigate careers in science and technology. Acting as a catalyst to stimulate and support community science initiatives, the foundation is focused on developing partnerships among communities, industries and educators to deliver new, innovative and responsive programs of informal science education.

PREMIER'S COUNCIL ON SCIENCE AND TECHNOLOGY

The Premier's Council on Science and Technology was chaired by former Premier Don Getty with vice-chairmen Hon. Fred A. Stewart, Minister of Technology, Research and Telecommunications, and Dr. Robert Church of The University of Calgary. This council of 31 members includes, in addition to the chair and co-chairs, the Ministers of Advanced Education, Education, Environment, the Associate Minister of Agriculture and representatives from the private sector, labour and academia.

Advice was given to the Government during 1991-92 in the areas of high performance computing, biotechnology, science and math education, public awareness of science and technology, the encouragement of women in science and technology, and Government support for science and technology.

Members were active participants in the Victoria National Forum of Science and Technology Advisory Councils. This Forum is held annually and is a meeting of all provincial and federal science and technology advisory councils.

FINANCIAL STATEMENT

Budget Estimates and Expenditures Classified by Vote, Sub-Program and Element

Vote 1	Development and Commercialization of Advanced Technologies	1991 - 92 Budget Estimates (includes special warrants)	Expenditures for the year ending March 31, 1992 (unaudited)
1.0.1	Minister's Office	$253,780	$282,406
1.0.2	Deputy Minister's Office	216,277	215,096
1.0.3	Financial and Administrative Services	914,997	783,662
1.0.4	Planning and Co-ordination	1,672,310	1,497,148
1.0.5	Business Development and Marketing	1,608,137	1,459,013
1.0.6	Corporate and Public Relations	774,168	661,139
1.0.7	Human Resources	111,052	115,421
1.0.8	Premier's Council on Science and Technology	376,192	321,027
	TOTAL	**$5,926,913**	**$5,334,912**
Vote 2	**Financing of Technology and Research Projects**		
2.1	Infrastructure Development and Support	-	-
2.1.1	Biotechnology	-	-
2.1.2	Electronics/Microelectronics	$2,384,000	$2,384,000
2.1.3	Telecommunications/Information Services	1,054,000	1,154,000
2.1.4	Computers and Software	-	-
2.1.5	Advanced Manufacturing	-	-
2.1.6	Advanced Materials/Processes	2,600,000	1,100,000
2.1.7	Advanced Tech. and Engineering Support	2,852,000	2,752,755
2.1.8	Medical Research Support	370,000	370,000
	Total Sub-Program	**$9,260,000**	**$7,760,755**
2.2	Commercialization of Advanced Technologies	7,648,000	7,719,321
2.2.1	Biotechnology	-	-
2.2.2	Electronics/Microelectronics	-	-
2.2.3	Telecommunications/Information Services	-	-
2.2.4	Computers and Software	-	514,848
2.2.5	Advanced Manufacturing	-	29,623
2.2.6	Advanced Materials and Processes	6,400,000	7,468,205
2.2.7	Emerging Technologies	1,801,000	681,928
2.2.8	Medical Innovation	-	-
	Total Sub-Program	**$15,849,000**	**$16,413,925**
	TOTAL	**$31,035,913**	**$29,509,592**

RESEARCH AND DEVELOPMENT (R&D) AND RELATED SCIENTIFIC ACTIVITIES (RSA) EXPENDITURES

Technology, Research and Telecommunications, in co-operation with Statistics Canada, conducted an annual survey of Alberta Government departments and agencies which fund research and development and/or related scientific activities. The following pages provide a brief overview of the 1991-92 survey. Please note that the Alberta Research Council is excluded from this survey, although it is a large part of Alberta's research community. Data for the Research Council is included in a separate survey for provincial research organizations.

The data from the science survey is based on each respondent's interpretation of definitions and methods of calculation. While these are still estimates, they are a good indicator of the year's science expenditures. However, the reader should be cautioned when drawing conclusions from the data and should be made aware of an estimated confidence interval of ± 15 per cent. Please note that figures may not add due to rounding.

Data for the 1991-92 fiscal year are preliminary.

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Science and technology (S&T) activities include research and experimental development (R&D) and related scientific activities (RSA). Activities in the natural sciences or social sciences and humanities are included in S&T.

Research and experimental development is defined as creative work undertaken on a systematic basis in order to increase the stock of knowledge. R&D projects generally contain an element of uncertainty, novelty and innovation.

Related scientific activities include education support, technical and statistical surveys, information services, special services and studies, and museum services.

The natural sciences include disciplines involving the understanding, exploring, developing or utilization of the natural world. Areas include engineering, mathematical, environmental, life and physical sciences.

Social sciences and humanities includes all disciplines involving the study of human actions and conditions, and the social, economic and institutional mechanisms affecting humans. Examples are demography, economics, history, law and political sciences.

SCIENCE AND TECHNOLOGY EXPENDITURES

Despite the increase in 1990-91 S&T expenditures, there was a sharp decline for the 1991-92 fiscal year. Expenditures by the 25 departments and agencies which reported S&T activities totalled $233.7 million this year. This is a $34.5 million (or 12.9 per cent) decrease compared to the previous year.

It is interesting to note that, while RSA expenditures remained stable at about $100 million, R&D expenditures fell by $34.5 million. This amount is equivalent to the fall in total S&T expenditures. As a result, the percentage of S&T expenditures that the Alberta Government spent on R&D fell below 60 per cent for the first time in over 10 years.

Table 1. Total S&T Expenditures by Type of Activity, 1987/88 - 1991/92

Activity	1987-88	1988-89	1989-90	1990-91	1991-92
			($ Millions)		
Natural Science	213.1	206.3	198.1	222.6	192.8
Social Sciences	41.0	42.3	49.2	45.5	40.9
Total R&D	254.2	248.7	247.3	268.2	233.7
Total R&D Expenditures	172.7	150.1	148.2	168.3	134.2
Total RSA Expenditures	81.5	98.6	99.1	99.9	99.5
Total R&D/Total S&T	67.9%	60.4%	60.0%	62.8%	57.4%

The decline in overall S&T spending can be traced mostly to the Alberta Oil Sands Technology and Research Authority (AOSTRA); Technology, Research and Telecommunications (TRT); and Transportation and Utilities. Spending by these three departments were down by $21 million, $11 million and $2.6 million respectively.

On the positive side, significant increases were noted in the departments of Forestry, Lands and Wildlife (FL&W), Environment, and Culture and Multiculturalism. Collectively, these three departments increased their expenditures by almost $7 million. Overall, there were 12 departments/agencies that had higher science expenditures than last year.

There were 19 organizations which reported in the social sciences category and 13 in the natural sciences category (six organizations reported in both sciences). Despite the majority of organizations reporting in the social sciences, the ratio of natural science to social science expenditures was almost five to one.

OBJECTIVES OF R&D AND RSA EXPENDITURES

Table 2 gives a breakdown of total expenditures by objective. Of the nine objectives listed, Industrial and Economic Development had the largest share with 31.3 per cent, or $73 million. Much of this was spent on R&D in manufacturing and agriculture. Other major objectives were Environmental Issues, Social Development and Health.

Environment Issues represented 20.3 per cent of all objectives. The major funders were the departments of Forestry, Lands and Wildlife (FL&W) and Environment. However, FL&W was the main contributor, mostly in the form of forest management. Support in Social Development came primarily from the Department of Culture and Multiculturalism. The $21.7 million spent there was in support of culture, sports and recreation.

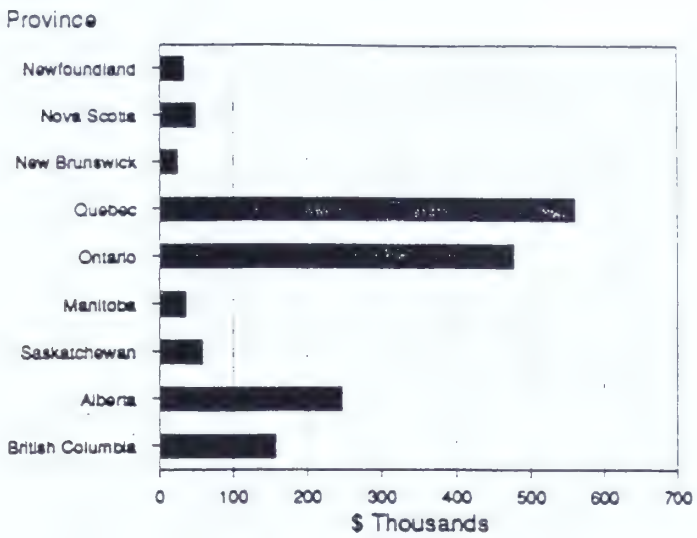
The Health objective was supported by the Alberta Heritage Foundation for Medical Research (AHFMR) and the Department of Health. These two organizations represented 93 per cent of this objective and had their activities directed mostly to research and development.

Table 2. Objectives of Expenditures by Activity, 1991-92

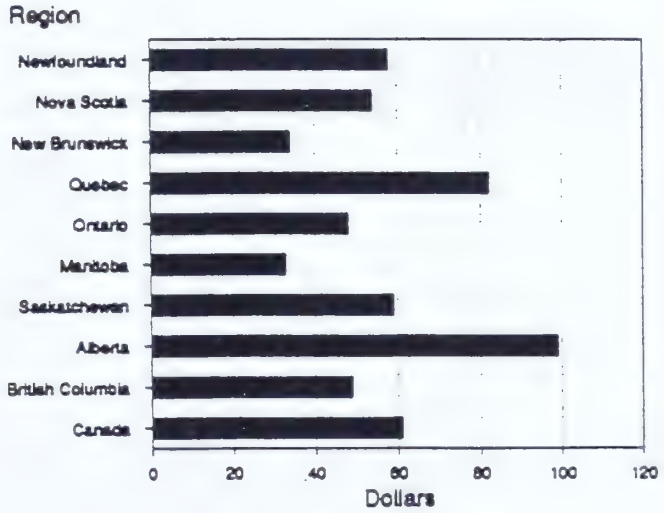
Objective	R&D	RSA	Total	Percent
	($ Thousands)			
Advancement of Science	8,186	1,635	9,821	4.3%
Energy and Fuels				
Fossil Fuels	17,296	4,503	21,799	
Renewable Resources	1,350	417	1,767	
Sub-Total	18,646	4,920	23,566	10.1%
Environmental Issues				
Air	1,476	1,538	3,014	
Land	5,272	1,995	7,267	
Water	2,294	5,326	7,620	
Other	2,867	26,377	29,244	
Sub-Total	11,909	35,236	47,145	20.2%
Health	32,781	3,310	36,091	15.4%
Industrial and Economic Development				
Agriculture	15,888	5,979	21,867	
Forestry	1,171	346	1,517	
Manufacturing	41,321	1,793	43,114	
Other	3,627	2,913	6,540	
Sub-Total	62,007	11,031	73,038	31.3%
Social Development				
Culture, Sports and Recreation	-	21,700	21,700	
Education	-	852	852	
Human Resources	116	4,405	4,521	
Urban and Regional Studies	795	70	865	
Other	1,003	4,111	5,114	
Sub-Total	1,914	31,138	33,052	14.1%
Transportation	2,275	4,927	7,202	3.1%
Wildlife	172	1,477	1,649	0.7%
Other	-	2,103	2,103	0.9%
TOTAL	**134,206**	**99,461**	**233,667**	**100.0%**

In comparison to other provinces, Alberta ranked third in provincial S&T expenditures but was first in per capita S&T expenditures.

Graph 1. Provincial Government S&T Expenditures by Province, 1989-90



Graph 2. Provincial Government S&T Expenditures Per Capita by Region, 1989-90



TOTAL EXPENDITURES BY DEPARTMENT/AGENCY AND PERFORMER

With 25 departments and agencies reporting S&T activities, four contributed over one half of all science expenditures. The departments of TRT, FL&W, the AHFMR and AOSTRA spent over $125 million in scientific activities. Furthermore, the top seven organizations accounted for 83 per cent of all S&T expenditures.

A large portion of activities were performed intramurally by the funding department (42 per cent). The departments with the largest intramural spending were Environment and FL&W.

The other sectors funded by the Provincial Government were industry, university and provincial research organizations (PRO).

The industrial sector, which received just over $40 million of provincial S&T dollars, was primarily funded by AOSTRA, TRT and FL&W. Collectively, these three organizations provided almost 70 per cent of industry funding.

The university sector performed 18 per cent of S&T. Funding to this sector came primarily from the AHFMR and the Department of TRT. The AHFMR spent over $24 million in support of medical research at Alberta's universities.

Monies to provincial research organizations (the Alberta Research Council) totalled $34.4 million. Seventy-five per cent of this support came from the Department of TRT.

Table 3. Total Expenditures by Department or Agency and Performer, 1991-92

Dept/Agency	Intramural	Industry	Univ.	PRO	Other	Total
			($ Thousands)			
ACCESS Network	135	-	-	-	-	135
Advanced Education	456	-	100	-	-	556
Agriculture	13,836	790	3,103	745	3,393	21,867
AADAC	919	-	-	-	-	919
Attorney General	-	-	-	-	303	303
Career Development and Employment	1,235	644	158	-	2	2,039
Culture and Multiculturalism	15,020	2,610	-	-	4,020	21,650
Economic Development and Trade	1,673	-	69	-	922	2,664
Education	1,273	46	64	-	1,019	2,402
Energy	813	2,170	297	1,397	975	5,652
Environment (1)	18,566	2,089	112	1,121	1,013	22,901
Environment Council	1,606	-	-	-	-	1,606
Family and Social Services (2)	800	100	25	-	75	1,000
Forestry, Lands and Wildlife	19,190	6,337	133	629	710	26,999
Health	1,006	486	1,647	-	2,351	5,490
AHFMR	1,840	608	24,757	-	1,067	28,272
Labour	752	-	-	-	-	752
Municipal Affairs	2,873	1,033	111	-	-	4,017
AOSTRA	4,831	11,668	3,306	4,068	1,415	25,288
Occupational Health and Safety	650	-	177	-	48	875
Solicitor General	1,300	545	-	48	875	
Technology, Research and Telecommunications	1,187	9,618	7,741	26,155	413	45,114
Tourism, Parks and Recreation	1,219	996	-	-	-	2,215
Transportation and Utilities	5,611	356	180	308	410	6,865
Treasury	2,030	211	-	-	-	2,241
TOTAL	**98,821**	**40,307**	**41,980**	**34,423**	**18,136**	**233,667**

(1) includes the Alberta Environmental Centre (Vegreville)
(2) figures estimated

SCIENTIFIC PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES

Personnel engaged in S&T represented 1,828 person years (PYs). The majority were involved with RSA. In total there were 1,278 PYs performing RSA, 430 in R&D, and 120 in the administration of extramural programs (AEP).

Over 72 per cent of personnel belonged to one of four departments: Agriculture, Culture and Multiculturalism, Environment or FL&W. As a result, these departments also had the highest intramural expenditures.

Table 4. Personnel Engaged in Scientific Activities, 1991-92

Department/Agency	RSA	R&D	AEP	Total
Agriculture	256	132	12	400
Culture & Multiculturalism	280	-	3	283
Environment	152	191	2	345
Forestry, Lands & Wildlife	247	21	34	302
Other	343	86	69	498
TOTAL	**1,278**	**430**	**120**	**1,828**

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